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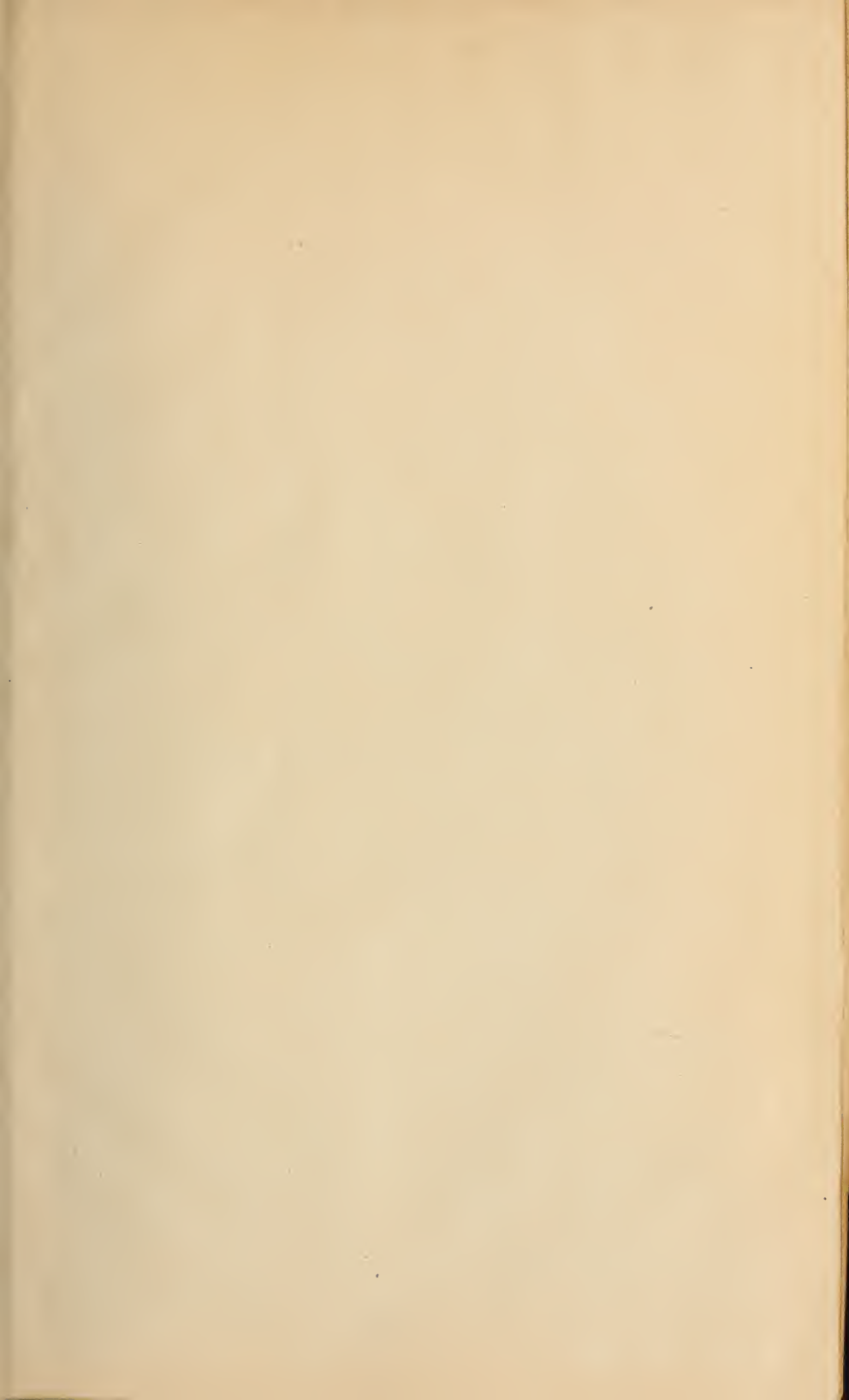
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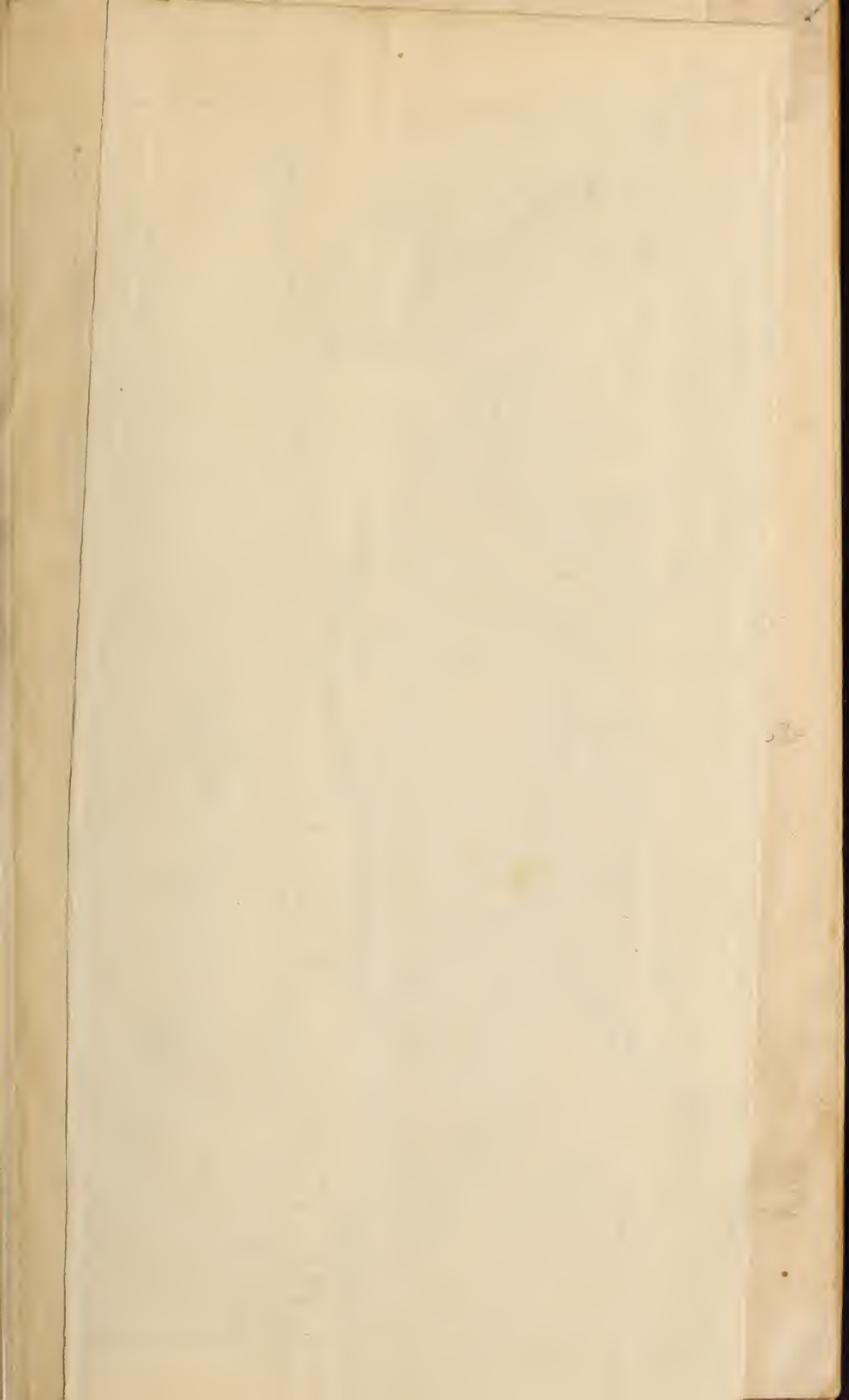






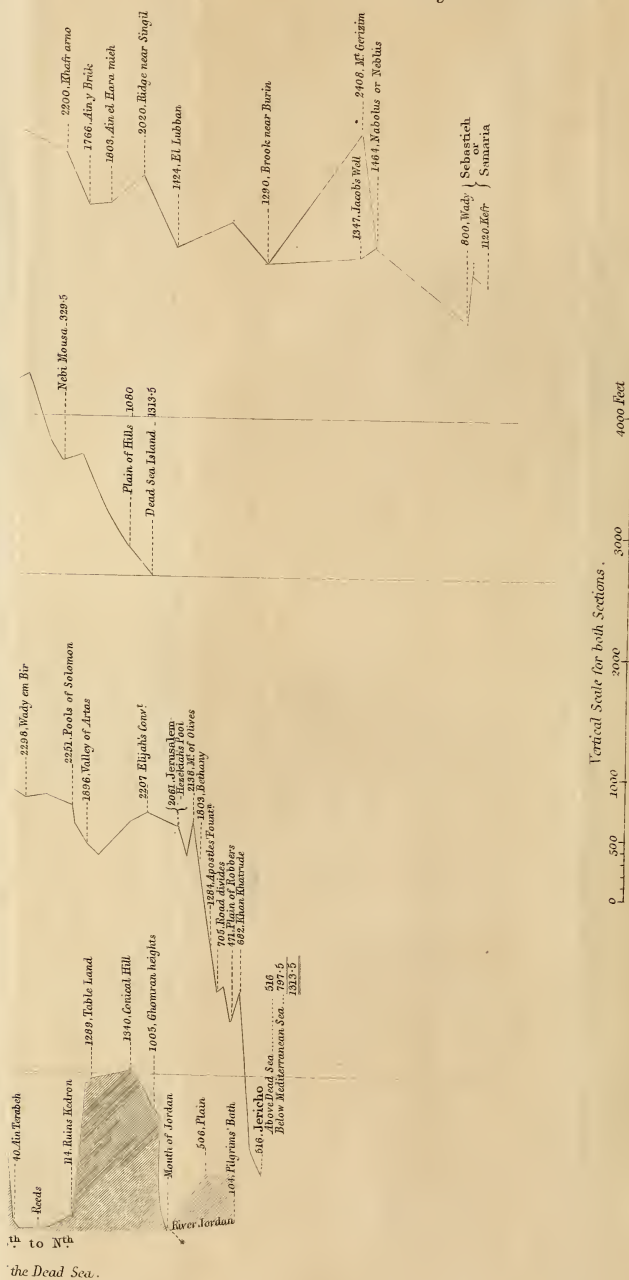






ppa & Samaria, also to the Dead Sea.

Haury Poole, Feb'y 1856.



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## REPORT OF A JOURNEY IN PALESTINE.

September 27, 1855.—Leaving Constantinople for Jaffa by the steamer, we stopped a short time at Gallipoli, the Dardanelles, Tenedos, Mitylene, Smyrna, Chio, Rhodes, Marsine, Alexandretta, Latakia, Larnaca in Cyprus, to land and take in goods and passengers.

October 7, Sunday.—Arrived at Beyrút.

October 9.—We stopped for a short time at Mount Carmel, and anchored off Jaffa at 3 P.M.

October 10.—The Vice Consul arranged about engaging horses to take us to Jerusalem. He informed me that 150 okes or 400 lbs. were a camel's load from Jerusalem; the charge for carriage 25 piastres or 4s. 2d. per load. The charge for storage was 10 piastres or 1s. 8d. per load for a reasonable time; the season for shipping from Jaffa was from June to November. The principal imports were salt and manufactured goods; the exports were cotton and grain; population 25,000. I left Jaffa at 4 P.M. and passed between hedges of prickly pears, protecting orange-trees loaded with fruit, for some distance; the soil appeared to be red sand, and where rock showed it seemed to dip to the east. The ground rose gradually until we came to Ramleh at 7 P.M., where we rested at the house of the Consular Agent.

October 11.—I left Ramleh at 1:30 A.M., and rode over cultivated ground: at 4 A.M. we began to ascend the mountain-pass; the rock was limestone, dipping about 8° to 10° W.; we reached the summit at 6:30 A.M., passed the village of Abú Gosh, and a church in ruins at 7 A.M., as we descended on the E. side of the mountain. At 7:30 we reached a spring, where the limestone had a slight dip to the E.; we then crossed another hill of limestone; passed over a stone bridge, near the village of Kulonia, and arrived at Jerusalem at 10:30 A.M. By aneroid the bottom of Hezekiah's Pool was 2064½ ft. above the level of the Mediterranean. Bedouins came with camels loaded with raisins, very large and luscious; also carbonate of potash from the district of Salt to the east of the Jordan.

October 17.—At 7:30 A.M. I felt three smart shocks of an earthquake at Jerusalem. At 3 P.M. I went to meet Mr. Consul Finn







returning from his tour, and accompanied Mr. Graham on his way to Damascus, as far as Nablus. We rode out at the Bethlehem Gate; over Scopus, by the base of Mount Gibeon, through Rám-Allah, and camped at Bireh. Limestone rocks prevailed the whole way, and a good deal of the country was cultivated in terraces.

*October 18.*—I got some shelly limestone before leaving Bireh. The rock on the top of the hill was nearly flat, slightly inclined to the E.; large cleared spaces are used for threshing-floors. In an hour and a quarter we arrived at Bethel, where is a large pool in ruins, also a tower. On the top of the hill were large masses of blue limestone with shells. An hour later we passed near Ain-y-Borek, where the mountain-road was by the side of a precipice; the mountain appeared to have been split, for the stratification on both sides of the ravine corresponded. Another hour's ride brought us to Ain-el-hara-mich, or the Robbers' Spring, in a narrow defile. The perpendicular rocks were curiously marked, as if by torrents of water, by deep longitudinal grooves up to their summit. We passed the Khan-el-Liban, then rode over an extensive plain, near to Burin, and reached Nablus at 7.30 P.M., situated on the E. side of Mount Gerizim, whence it is well supplied with springs of water.

*October 19.*—I went to the top of Mount Gerizim, and during the ascent got nummulitic limestone; in some parts the rocks had been in a liquid state, for one kind had overflowed and encased another. By aneroid, the summit was 2412½ ft. above the Mediterranean, and 1274 ft. above Nablus, to which we returned at 7 P.M.

*October 20.*—I rode to Samaria, passing through a great deal of fertile, well-watered country, and observed that the springs of Nablus were the summit sources of streams flowing both ways, to the Jordan and to the Mediterranean. Most of the way between Nablus and Samaria is covered with masses of flint, called by the inhabitants chalcedony. The hill of Samaria is composed of limestone.\* The land appears to be fertile, and I saw a great many mistletoes on the olive-trees; indigo and sesame were also grown in the valley.

*October 22.*—I left Nablus in company with Mr. Finn at 9.20 A.M., and visited Jacob's Well and the tombs of Joseph and Eleazar; the rocks were everywhere limestone; we reached Bireh at 8 P.M., where we camped for the night.

*October 23.*—We left Bireh at 9 A.M. and returned to Jerusalem.†

\* The Mediterranean Sea bore s. 61° w. | Mount Ebal .. .. s. 48° E.  
Mount Gerizim .. .. s. 33° E. | Variation 10° w.

† Dr. McGowan, of the British hospital at Jerusalem, has registered the rain for some years, and found 108 inches the greatest quantity in any one year.



*October 24.*—I called on the Consul, and arranged through him with Mattien Fadlallah for horses, tents, and provisions for the Dead Sea; he also sent a messenger to Abú Daouk, sheikh of the Djahalins, for a guard, as we had to pass through his territory; also sent to Elijah Mashallam to ask him to accompany me, and act as interpreter.

*October 25.*—I visited the tombs and other remarkable sites around Jerusalem, while waiting for the arrival of the guard of Arabs.

*October 26.*—At 8.45 A.M. I left Jerusalem and rode through Bethany: the limestone dipped about  $15^{\circ}$  to the E. At 11.05 the road to Jericho branched off to the E. We soon after passed near the ruined Khan-el-Lachmé, where white nodules with black flint in the centre were thickly strewed about. At 11.45 we passed Durbez-zuar; saw Tirb-rearché to the E. At 12.30 came to the junction of valleys Dubbak and Cavern of Hiram-em-Dowrah; the cisterns in limestone were dry. Thence we rode S.E., and ascended a hill where chalk was vertical with a yellow tinge; strike N.N.W. and S.S.E. The road was through barren hills and steep ravines, and at 1.15 P.M. we passed a curious pinnacle of sharp broken rocks; at 1.45 we crossed a ridge, where thin layers of sandstone alternated with the chalk; and a little farther on, the hills were covered with red clay, and we reached Nebi Musa \* at 2.05 P.M., which by aneroid was 2495 ft. below Jerusalem, and  $329\frac{1}{2}$  ft. below the level of the Mediterranean. The soil smelt very strong of sulphur, the rocks dipped to the N.W., and I got specimens of limestone of an oolitic structure, also of a seam of bituminous and calcareous limestone, with pectens about 6 in. thick, of which bowls, seals, &c. are made. Thermometer was  $89^{\circ}$  Fahr. in the tent at 3 P.M.

*October 27.*—I left Nebi Musa with a single Arab at 4 A.M. to ride to the Dead Sea—said to be three hours distant. I reached the shore in an hour and a half. We rode through steep winding defiles: the ground sounded harshly under the horse's feet. Thermometer in air  $70^{\circ}$ , in the Dead Sea  $82^{\circ}$ , and fell to  $64^{\circ}$  Fahr. in drying. I waded in to a depth of 4 ft., where I filled a bottle with the water, and got a specimen of clay and bituminous stone; this was near the island as marked on the maps, but which I found to be a promontory with a few dead shrubs encrusted with salt upon it. The water was beautifully clear and calm. The line of drift-wood was 4 ft. above the present level of the sea; rounded pebbles of different kinds formed the beach; but I could not find either sulphur, nitre, or bitumen. By aneroid the sea was  $1313\frac{1}{2}$  ft. below the Mediterranean, and  $3450\frac{1}{2}$  ft. below Jeru-

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\* A hard fawn-coloured limestone, shelly, and full of fragments of bone; also nuculæ and lima in limestone.

salem. My Arab guide did not like me to remain long, as seven Arabs of another tribe came from the Jordan to see who we were. We left the shore of the Dead Sea at 6:30 A.M.; crossed the first ridge at 6:50; passed over what I thought might have been the original level of the old plain at 7:15, and 532½ ft. above the Dead Sea. At 7:30 we reached the top of the mountain, 1025 ft. above the Dead Sea, and we got back to Nebi Musa at 7:50, having been only 1:20 hour in returning. I left Nebi Musa at 9:30 A.M., and arrived at Jerusalem at 2:45 P.M., so that a person might easily go in 6½ hours from Jerusalem to the Dead Sea by this route. In the evening I arranged with Abú Daouk, that the number of the guard was not to exceed 12 men, at 10 piastres each per diem, and 20 piastres per diem for himself and horse.

*October 28, Sunday.*—Adam Bek, deputy Pasha, called on me: he was much interested with the aneroid, and anxious for a railroad to be made to Jerusalem.

*October 29.*—I left Jerusalem at 10:30 A.M., and rode by way of Bethlehem to Urtas, where Elijah Mashallam joined me. This valley is very fertile, being watered by the Pools of Solomon, which we passed at 1:30 P.M. By aneroid the aqueduct was 81 ft. above the bottom of the Pool of Hezekiah in Jerusalem. The ground kept rising until we reached Khan Cull at 5:15 P.M. We arrived at Hebron at 6:30 P.M., where we encamped. Wolves, jackals, boars, foxes, badgers, and porcupines abounded. A great deal of land is cultivated, and large vineyards were near the town.

*October 30.*—We had to remain all day to enable the muleteers to get barley, water, and other articles for the journey. I went to see a tree called Abraham Oak, 23 ft. in circumference, near which I got two fossil shells. We afterwards rode to visit the ruins of Rama, on the plain of Mamre, and passed by the E. side of Hebron, where the limestone was nearly level, dipping slightly to the S.E. At 2 P.M. we passed by Ain-es-Lin, where I got fossil shells much crushed. The ruins at Rama measured 214 ft. from E. to W., by 165 ft. N. to S.; the walls were 5 ft. 10 in. thick, of shelly limestone.

*October 31.*—We left Hebron at 8:15 A.M. and rode nearly S., and at 9:45 passed the ruins of Ziph, about 1 m. off on our left. At 10:30 I visited the ruins of Em Sirkan, which must have been a large city; soon after, going due S., we passed other ruins, and came to Birket-el-Kurmél at 12, where there is a ruined tower, extensive ruins, and a large pool filled up with dirt; but a good spring of water in a cave on the N. side of the pool. From El Kurmél we travelled E., and at 1 P.M. came to a well at Tawaná, then crossed a ridge, and descended into a plain on a S.E. course, with a dry water-course and rocky sides; at 1:45 P.M. we crossed another ridge, and at 2 P.M. reached the encampment of the Djahalins, consisting of about 70 long tents made of goats' hair.

Our baggage did not come up until 4 P.M., so we had to camp there. There were not any trees or shrubs on the route, after having left Hebron; the rocks of limestone continued unchanged.

*November 1.*—We left the camp of the Djahalins at Tawan at 9·15 A.M., and rode s. till 10·15, when we came to a well and watered our horses; we left at 11 A.M., and rode on a s.e. course till 12·25, when we came to the valley of Drippings (Wadi Mahras of Lynch), where chalk showed in several places overlaid by limestone. At 1·40 P.M. we came to a ridge where I got a view of the Dead Sea; at 2·10 P.M. we reached Ermelé, where I had a good view of the s. end of El Lisan, or the Peninsula, and the s. bay of the Dead Sea; we then descended a steep bank to a dry brook, then rose again and crossed a ridge at 3 P.M. with a high mountain (Masada) on our left. The country was quite barren the whole way, and very hot. At 3·23 we came to a plain, where the sheikh wanted to camp, but I thought it too early in the day, and pushed on until 4·30, when we camped at the Bed of the Dervish. Picked up a small piece of lava.

*November 2.*—We left the camp at 8·10 A.M. and rode on a s.e. course; at 9 A.M. we passed a large Talkha tree, and then rode through a defile, called the "Bazár Pass;" the rock looked like cinders of sulphur. At 9·40 we passed what appeared to be an old crater: the rocks dipped N., s.w., and s.e. At 11 A.M. we came to the top of the ridge Nejeb. We now descended rapidly by a winding path, and at 11·45 passed a ruined tower called El Zuereh, and at 12·35 pitched our tents on the plain of Usdum. The temperature in the tent was 90°. The horses had to go to Em Berghek for water, and did not return until 5 P.M., so we were not able to ride anywhere. I walked down to the shore of the Dead Sea, and got a bottle of the water, temperature 83°; it was not so clear as at the north end, but was more saturated with brine. Crystallized salt extended 40 yards in width from the water's edge, and the line of drift-wood was 70 yards distant. I picked up crystallized spar and saw a flock of about 30 black and white birds, swimming in a line and diving out in the water. I found no shells upon the shore. We passed a hole where a camel had fallen through the encrusted sand, which was about 60 ft. above the present level of the sea. Many parts sounded hollow, as if there were subterranean watercourses.

*November 3.*—We rode to the Cave of Usdum, which I found was about midway of the length of the mountain, and on the east or side next to the sea. Rock salt was visible all the way along in the mountain side with limestone overlying it, with a general dip of 45° w. The rocks of the cave were composed of large, loose, broken masses, so we could not penetrate far; but I was told by the Arabs as well as the tent men, who had been along with De Sauley, that we had penetrated farther than other travel-



lers, as no one previously had observed the long stalactites of salt which I discovered ; and yet by measurement I had not gone over 200 ft. in a direct line into the cave. I also observed that there was a current of air passing into the cave and ascending towards the roof where the stalactites were, so I had no doubt but there was a communication with the top of the mountain at that place. I got spar above the rock salt, but could not find any nitre. Marshy ground at the south end of the Dead Sea had a red appearance, but the mud was too soft for any person to walk upon it. On returning to our camp, I saw a flock of nearly 100 black wild fowl, diving and flapping their wings in the Dead Sea, and I could not but think that both the flocks had been feeding at the time.

*November 4, Sunday.*—We attempted to ascend Mount Usdum from the west side, and went up a water-course to a height of 270 ft. by the aneroid, when I found the side so steep and full of fissures, that I did not like to proceed for fear of breaking my instruments ; there were pinnacles of salt in every direction. The highest point must be 400 ft. above the Dead Sea. At 10 A.M. we left Usdum and rode along the western shore ; I saw many dead trees standing in the Dead Sea for some distance from the shore in the bay. At 10.45 we came to a brine spring, temperature 90°, about 100 yards distant and 30 ft. above the level of the sea. It spread over some extent of ground where the kali plant grew freely. At the drift line and a few yards from the Dead Sea, to which there was a free communication by the running stream, I caught several little fish\* from half an inch to one and a quarter inch in length ; I therefore think there must be fish in the sea from whose spawn these little ones had been produced. The same kind of fish, some three inches long, were afterwards seen in the "Spring of the Morass" near the north end of the sea, but none could be found in any of the brooks running into the sea upon the west or south shore. A duck came flying across the sea to this spot just as we left it, most likely to feed there. A number of camels came to Usdum for salt ; the Arabs get 60 piastres or 10s. per load of 500 lbs. at Jerusalem, the purchaser paying the Turkish Government a duty of 15 piastres per load additional. A camel could not make more than 24 trips in a year under favourable circumstances.

*November 5.*—We left Usdum at 8.45 A.M., passed the Cave at 10 A.M., and rode south until we came to the end of Usdum ; we then crossed at 11.10 a brook, dried up in places, from which the Arabs, at present, collect their salt. Thence we rode S.E. across a marshy plain without a sign of vegetation. The road is

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\* These fish have been sent, through the British Museum, to Sir John Richardson, who has named them *Lebras*, or *Cyprinodum Hummonis*, and who has promised to describe them. Cuvier describes similar fish as being found in the Red Sea.

not passable in wet weather. I passed 11 dry brooks and stopped at 12.15, near the rank growth of reeds on the eastern side of the plain, until the baggage-mules came up. A very white range of mountains continued s. from Usdum, and a countless number of conical hills covered the plain to the s. I saw the mountain of Petra in the distance, but could not distinguish any opening in that direction. Just as we were passing through the belt of reeds we were attacked by a band of Bedouins (45 of the Beni Orkbé tribe) armed with spears and pistols: fortunately they could not use the former among the tall reeds, which gave time for a parley. One of my guards belonged to the Tamari tribe, friendly with the Beni Orkbé. They recognised each other, and he told them that my party was under the protection of his tribe, the Tamari; they therefore agreed to let us pass without molestation. They had threatened at first to shoot Abú Daouk, as he was at war with them, and had stolen a number of their camels; one had thrown his spear at me, which luckily fell short; another rode up and took hold of the muzzle of my gun, which I then turned towards his body; upon which he left hold of it and rode off. It thus turned out that we were fortunate in having engaged the Tamari. The Beni Orkbé dismounted and piled their spears while we rode past them. We gave some of them a little tobacco. This encounter detained us until 1.30 P.M., when we passed along through a variety of trees and shrubs and cultivated patches of ground. At 2.30 P.M. we crossed three small brooks of swiftly running water not far from each other, called by the Arabs "Ain es Ashkha," and at 3 P.M. came to a large encampment of the Ghoranhi: the plain being called Ghor. A sirocco at night first filled our tent with sand, and afterwards blew it down.

*November 6.*—A calm morning. A ruined tower called Kasar-Aswad was on the mountain side, opposite to the tents. We started at 10 A.M. and rode through a very large plantation of maize, and travelled by the lower or shore road. After passing the cultivated lands near the river Ashkha, we crossed a stagnant brook, and rode along the side of a bay with very little saline incrustation; we then passed large boulders of conglomerate, afterwards boulders of red sandstone, of which some had black veins and others red or yellow veins running through them. At noon we reached the north side of the bay, where a point of land juts out into the sea, about 2 m. across; it was covered with mimosa and other trees near the base of the mountains, while the other parts were covered by bushes or rank vegetation. We then rode along another bay close to the water's edge, which washes the base of the mountain. The rocks here showed a horizontal stratification in a line parallel to the shore, having a dip to the east. The highest ridge had a red tinge, the next ridge was of a dark brown colour, while at their base were one or two appearances of chalk.

A great many places appeared like extinct craters, and the whole line of mountains was full of rents and sharp points. At 1 P.M. we rode across a second point with a number of mimosa trees on it, and near them some ruins. I noticed two stones which had been hewn and dressed; farther on were numerous lines of foundations as of an extensive town. The tomb of the Sheikh Salakh, or "Peace," was also on the point. He is the patron saint of the Bedouins, who still sacrifice at his tomb before going on their predatory excursions. At 1·20 P.M. we rode through loose rocky ground, which was furrowed by the winter rains. Two brooks were still running. We then rode round another bay, and at 3 P.M. we came to the south side of the peninsula, El Lisan, or the "Tongue." This was the spot where Ibrahim Pasha fought the four tribes of Bedouins, viz.: Beni Orkbé, Beni Suchké, Beni Hamidé, and Kerak. Ibrahim is said to have lost 20,000 men in the battle and among the mountain passes, and the Bedouins to have lost only 7,000 men. He did not subdue them. We next passed the Pool or Birket el Ketmé, which measured 82 ft. square and 11 ft. deep to the mud. It had been plastered inside, and the first coat had been scored for the better adhesion of the second. Traces of an aqueduct and other buildings still remained: this was, no doubt, the site of an ancient city, but not so large as the one near Sheikh Salakh's tomb. I picked up a number of shells of *Turritella* in the pool. I then rode east across the peninsula; the soil appeared sulphurous, and was full of small hillocks and dry water-courses. At 4·15 P.M. we came to a small swift running stream, "Wadi el Deraah," flowing down into the bay formed by El Lisan. On our right on the main land, we observed ruins which are called Khirbé tawarken-el Suker, or ruins of the sugar mills, which would indicate that sugar-canes had been formerly grown there. At 4·30 P.M. we came to another settlement of the Ghoranhi, who were more numerous and uncivilized than those at the first Ghor. Few of them, even men, had on more clothing than a strong cotton shirt. They mentioned that a shock of an earthquake had been felt three days before; it was also felt at Jerusalem.

*November 7.*—The Beni Orkbé returned with thirty-five camels, which they had stolen from a village on the west side of Usdum, and coolly said that they had shot two men and a woman of the Assaymis tribe, who had resisted them. They had not fed or rested their horses since they parted from us at the Ghor, and now killed a camel, upon which they feasted; and our Arabs gladly accepted their invitation to join them. At 10·30 A.M. I left the camp with Elijah Mashallam, the Ghor Sheikh, and one mounted Arab, to explore the Peninsula. We passed a mound, which we were told was an old grave; saw the tracks of gazelles on the sand; and at 11·15 we reached the s.w. corner of the Cove. The



stratification of the hills of El Lisan was nearly horizontal, with a slight dip to the east. At noon we found a great many dead locusts lying on the beach; I also got specimens of spar and thin shales dipping s.e. about  $5^{\circ}$ , which continued nearly the whole way to the north point of El Lisan, which we reached at 12.40, and where I took the bearings of several places;\* filled a bottle with water from the Dead Sea, which was, at least, half a mile from the foot of the hill. There was not any break through the range of hills, as indicated by the map. I got a few specimens of sulphur and some botryoidal limestone. At 1.20 p.m. we left and rode along on the west side of the Peninsula; a ridge of rocks and breakers showed for some distance out in the sea from the north end, until we came opposite to Sebbeh, where they again united with the shore. There I saw three ducks settle in the water and swim along, as if feeding at the edge of the surf. At 2.45 p.m. I saw seven other ducks sitting on the edge of the shore. We tried but could not get within shot of either lot, which appeared to be smaller than those we had previously seen. At 3 p.m. our horses scrambled up the south end of the sulphur hills, and we reached the table-land at 3.30, where the aneroid made the height about 230 ft. above the Dead Sea; the banks of the ravines were nearly perpendicular, and at the base of them I observed the ends of trees sticking out as if it had formerly been a line of drift-wood. Two large circular depressions were observable on the table-land, and I noticed that there was a hole at the root of almost every shrub. The whole way was full of holes and cracks, down which rain would run, and the surface appeared covered with a sulphurous crust, beneath which the soil was of a soft chalky colour, and of a loose sandy nature. The ridge was about 2 m. wide, but is wearing away annually on both sides. We returned to the camp at 5 p.m. I only got two or three small bits of asphalt, and not any nitre: jackals were howling all night. The Sheikh of the Beni Orkbé wanted to escort us to Kerak and the river Arnon; and when he found that we were not going there he demanded backshish, and Abú Daouk gave him 100 piastres to prevent him from bringing down the other tribes upon us; we also promised to return at once to the west side of the Dead Sea.

*November 8.*—Thermometer  $72^{\circ}$  at 6.45 a.m. Some one had stolen my hammer as it hung on my saddle, and I complained to the Sheikh; but it was too great a prize to be given up again. We left the Ghor camp at 9.15 a.m. and rode to the ruins of the Sugar Mills, or Kherbet tawarken-el Suker, and of which I took the measurement. A fine stream was flowing alongside; the ruins

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* Mouth of river Arnon .. N. $30^{\circ}$ E.	Frank Mountain .. .. N. $20^{\circ}$ W.
,, Callirhoe N. $20^{\circ}$ E.	Birket el Khalil .. .. N. $54^{\circ}$ W.
Engedi Point .. .. N. $12^{\circ}$ W.	

lay within the range of the mountains and cover a large area, so that it must have been the site of a very populous city. We left at 11 A.M., having sent the baggage on in advance. At 11:40 we passed the pool, and at 12:25 came to the bay at the south side of El Lisan; we then crossed a point of land, and at 12:42 came to a second bay, where we rode close to the water's edge. At 1:30 P.M. we crossed two brooks of good running water, with oleanders blooming on their banks. At 1:40 P.M. we came to the Sheikh's tomb and the ruined tower, where a party of twelve Bedouins had posted themselves. They declared war against Abú Daouk, and threatened to fire; he talked boldly to them, although there were only five of us with him at the time, and we passed on without molestation. We got back to the first Ghor encampment at 3:35 P.M. I picked up samples of rock, which had apparently rolled down from the mountains of Moab.

*November 9.*—Up at 3 A.M. packing; thermometer  $60^{\circ}$  at 6 A.M. A very small grey-breasted honey-bird flew into the tent. We started from the Ghor at 8:10 A.M. I got some flowers and seeds from the osher-trees; also some black locusts, with yellow spots (*Petasia*), which were resting upon them. We passed the three streams at 8:36 A.M., and rode through the reeds, where we had been attacked by the Bedouins, at 9:24 A.M. All were glad to get out into the open plain, which we rode across. At 11:30 A.M. I went into a cave of Usdum, where were immense blocks of rock salt, but I could not find any nitre. Soon after we passed the principal cave, and reached the north point of Usdum at 12:55. The sea had very sensibly receded from the shore since we were there, and I should think had lowered a foot in perpendicular height. Arabs were collecting salt from the beach. We reached Em Berhek at 2:35 P.M., where many rows of large and heaped stones showed the remains of an extensive city. There were two pools: one measured  $33 \times 54$ , 6  $\times$  8 ft. deep, and had five steps at the north corner; the second pool measured  $38.3 \times 39$ , 9  $\times$  8.6 deep. The latter did not appear to have been square. There were the remains of a fort on the north or opposite side of the ravine. The brook wound through the rocks, and about a quarter of a mile inland there was a fall of 10 or 12 ft., from which point there had formerly been an aqueduct leading to the pools. Here I found a crab\* and some fresh-water shells.† It thundered and kept very hot at night, being  $83^{\circ}$  in the tent at 10:15 P.M.

*November 10.*—I took the measurement of the ruined fort. Abú Daouk told me that when a boy he had crossed over to El Lisan from this point on a camel. We left at 10:15 A.M., and very soon afterwards had to leave the shore, as the mountains came directly into the sea, and there was no beach to ride along; we had to

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\* *Thelphusis.*

† *Melanopsis, Buccinum.*

travel along a very bad path, about 200 ft. above the level of the sea. At 11·30 we passed over a hill, where the rocks dipped n.w. about 30°. We then descended on to an extensive plain, with some mimosa trees growing on it, which is marked on the map as the point of the occasional ford. At 11·48 A.M. we passed the dry Wadi-Em-Dún, or Wild Goats, which must sometimes be a torrent, from the size of the rolled stones in it. At 2·23 P.M. we were parallel with the ruins of the Sugar Mills, among masses of broken rocks, and some horizontal strata of the same kind of sulphurous limestone as on El Lisan, which spread over an immense area, full of fissures with steep sides. I should imagine that they had been made by earthquakes, and afterwards the rain had carried down the loose soil from their sides: some hills appeared like round towers. We rode between them and the mountains, the sides of which were nearly perpendicular, and their summits some 1000 ft. above us. At 2·40 P.M. we came to Wadi Sebbeh, where there were extensive ruins on both sides of the Wadi, with indications of pools on its northern bank. The remains of walls, with towers at certain distances running parallel to the mountain, were easily traced;\* also the walls of buildings, with square sides, spreading over the plain. I observed that the convulsions of nature had taken place just along the line of the west wall, which remained on the upper level, while all inside of the supposed town had been sunk down to a lower level. At 3·15 P.M. we camped at the foot of the pathway leading up to Masada. Our camp, by aneroid, was 563 ft. above the Dead Sea; thermometer 80° at 5·30 P.M. The horses were watered at a spring about a mile to the north.

*November 11, Sunday.*—I walked part of the way up the mountain, passed a cave † in the limestone rock, and ascended to 429 ft. above the camp, when I found the path so narrow, with loose stones and precipitous sides, that I returned.

*November 12.*—We left Sebbeh at 8 A.M.; the air had a sulphurous smell. We rode along what appeared to be an old Roman road, the stones being cleared for about 20 ft. in width, nearly in a straight course. At 8·30 A.M. we came to a coarse sandstone, in thin layers, dipping s.e. about 10°; the stratification of the mountains appeared to be nearly horizontal. At 8·45 we came to the Wadi of Drippings, the outlet of the brook which we crossed from Hebron, and it took us 12 minutes to ride across the Wadi. At 9·12 we passed an Arab encampment, where the Sheikh and most of his men had spent Sunday. It bore due west of the north end of El Lisan. At 10·26 we passed the Wadi el Khubera, or the Spies. At 11·22 we rode down on to the plain Birket el Khalil, where tradition says that Abraham turned the salt into stone.

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\* Circumvallation of Silva according to Josephus.

† Moghârat el Kebrit of Lynch.



Numerous small heaps of calcareous matter are scattered about, which look like salt-heaps at a distance. I observed a sulphurous smell coming from the sea at this point. At 12·15 we arrived at the base of Engedi, which we ascended as high as the spring, which was 83° of temperature, the air being 86°.\* By aneroid, the spring was 710 ft. above the Dead Sea. Some Arabs of the Rashidy tribe were there, and talked very angrily of Abú Daouk taking strangers through their territory, until the Tamari told them that Elijah Mashallam was from Artas, when they became very civil; they said, "They and the heir of Artas were all of one tribe." There were the remains of a mill at the spring. The fruit of the osher-tree was much smaller than those gathered on the Ghor. A little attention to irrigation would make the whole of the hill-side very fruitful, and the remains of former terraces were clearly visible. We descended to our camp, which we reached at 2·10 P.M., situated by a spring of good water, and shaded by a belt of gigantic reeds. The Arabs bought a lamb, which they roasted in a hole of heated rocks. The cliff was about 200 ft. high on the north side of the stream, composed of coarse and fine limestone, flints, and sand. About midway up there were numerous caves, but quite inaccessible to us.

*November 13.*—We left Engedi at 8·45 A.M., and rode along upon the plain until 10 A.M., when we had to take a path over the mountain side, which was most execrable, being full of large boulders, through which there was great difficulty in getting the baggage-mules. We ascended 200 ft., then came down again on to the shore at 11 A.M. We passed by an apparent crater, called Khmeid, and began to ascend a second mountain at 11·45. We gained the summit of the first ridge at 12; the north end of El Lisan bore s. 23 E.; the height of ridge was 240 ft. above the Dead Sea. At 1·40 P.M. we reached the next ridge, 509 ft. up; the road was so bad that we had to unload the mules, and the men carried the baggage up a short distance; and they had to hold to the baggage and the mules' tails to check them in their descent. We did not appear to be half way up the mountains. We again reached the shore at 2·05 P.M., crossed a plain, and began to ascend, at 2·20 P.M., another mountain; at 3·30 P.M. we reached a table-land, 740 ft. above the Dead Sea, having crossed a succession of limestone-rocks, with steep banks on each side. We rode along this table-land north for a quarter of an hour, with a gradual fall towards the sea. The view was magnificent, and I could see Kerak tower very distinctly in the distance. We ascended another ridge for 14 minutes—height by aneroid 894 ft.—the main mountain still towering above us; we then made a rapid descent over sharp flints, with coarse conglomerate stones in the torrent's course, and

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\* Kerak bore s. 26 E. North point of El Lisan bore s. 28 E.



perpendicular rocks on our right hand. We arrived at the Ghor at 4.25 P.M., where I saw a heap of ruins, which I thought might have been a well. We then rode through the reeds to the shore, where fresh water springs up close to the edge of the sea, and which I think must be covered by the sea when it rises from the winter rain. Temperature of air was 84°; Dead Sea 80°; spring 79°. The water from the latter tasted soft and sweet, while that of the sea was so saturated that I could see the brine floating in it. The mules did not arrive until 5 P.M., and were much fatigued with their day's work. The Tamari picked up a small piece of asphalt, of which we found very little during the whole of our journey.\*

*November 14.*—I left the camp at 7.35 A.M., and walked along the shore about half a mile, when I came to a salt-spring, coming out from under a large rock near the sea, and 3 ft. above its level, and the temperature 80°: I took a bottle of it. I then walked on to the chief springs of fresh water, half a mile farther; the temperature of them was 80°. I saw a number of small fish, "Lebras," from  $\frac{1}{2}$  an inch to 3 inches in length, of the same kind as previously caught; but we could only catch one of them, from the water being abundant, and not able to confine them in a small space. We also collected a number of black shells, "Melanopsis." We left the springs at 9.45 A.M.; they extend for a considerable distance along the shore, and must yield a great many thousand gallons of water every 24 hours. At 10.20 A.M. we passed a cave, high up in the rocks, directly opposite to the mouth of the Callirhoe springs, and from which water appears sometimes to have flowed. At 11 A.M. we reached the dry bed of the brook "Kedron," and picked up "a small turreted shell;" at 11.20 we rode near to some ruins on the north side of the brook, but I did not go to them, as we had to ascend the mountain. At 11.45 we reached the pass in the first ridge, about 730 ft.; at 12.20 we came to the second pass, where one of the mules fell with my luggage, and all would have rolled down the cliff from a height of 1226 ft. if the Arab leading it had not kept firm hold of the halter, and got him unloaded. We reached the summit, 1340 ft., at 1 P.M., from whence I observed that there was a table-land or level plain, about the same height, on the opposite shore of the Dead Sea, extending from the Callirhoe springs to the north end of the sea. The sea was remarkably calm, and reflected the sky and mountains in a very wonderful manner. We now rode inland for some distance, and did not appear to be very far from the Frank mountain, bearing s.w. The rocks were chalk, with hard horizontal bands of limestone running through them. Mashal-

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\* North end of El Lisan bore s. 10 E.  
 Mouth of River Arnon s. 40 E.  
 „ „ Callirhoe N. 85 E.

lam picked up a flattened fossil-shell, like turritella. I observed that these mountain-tops were of the same white and sulphurous limestone as in the plain. If they were of the same geological age, and at one time level with the plain before the destruction of Sodom and Gomorrah, those cities would have been nearly of the same level as the Mediterranean. At 2.05 p.m. we came to a small conical hill, where we had a fine view of the valley of Ghomran and the surrounding hills. Abú Daouk wanted to camp there, but I would not consent, so we pushed on until we came to the cliff above the ruins of Ghomran; the height was 951 ft. above the sea. A good deal of bituminous limestone was lying about.

*November 15.*—I arranged for the baggage to go direct to Jericho, while Mashallam, the Sheikh, and four Arabs accompanied me to visit the ruins at the foot of the mountain: it was a very winding path and quite narrow in some places, so that a loaded mule could not have passed down. Abú Daouk boasted that he had once driven seventy camels up this pass on a very dark night, when closely pursued, and so eluded his pursuers, who thought to have found him encamped at Ain el Feshkah. We passed a small cave, whence hot air issued. We reached the ruins at 8.15, having descended 713 ft. I found the remains of an aqueduct, walls, pools, and some buildings: one pool measured 58 × 17 inside and 11 ft. deep; it had been plastered on large unhewn stones. A smaller pool measured 21 × 9 ft.; it was filled up with rubbish. The main wall was close to the side of the large pool on the sea-side, between which and the sea were a number of graves. One of them I had opened was 6 ft. long by 3 ft. wide, and 4 ft. 10 in. deep: it was built up on all four sides with rough stones and square corners; there were no osseous remains traceable. The ruins were 238 ft. above the Dead Sea, and the base of the hills, containing the graves, about 100 ft. above the sea. From the state of the ruins and graves, I should think Ghomran must have been a much more modern town than the supposed Gomorrah of De Sauley. We left the seashore at 9.53 a.m. and rode across the plain to Jericho, and saw a good deal of bituminous limestone scattered about. We passed some dry watercourses, which had lately had water in them, and crossed some sulphurous chalk-hills; picked up some spar. The ground was full of holes, made by a species of mole, called "gerdy," which made it dangerous to ride fast. Flints were strewed over the plain. The stratification of the mountains on the west side dips gradually to the north, so that opposite to Jericho the same strata are down on the plain which were on the mountain tops at Ghomran. We arrived at the tent, which was pitched near the guardhouse at Jericho, at 2 p.m.; thermometer in tent 91°. A running stream passed close by. The village was a dirty, miserable-looking place, with stone walls, and branches of trees formed the roofs of the houses. A guard of fifty Turkish

soldiers live in the tower to collect the taxes and protect travellers. Maize, wheat, indigo, and egg-plants thrive there; potatoes have also succeeded very well. Jericho, by aneroid, was 516 ft. above the Dead Sea. The thermometer fell to 62° at 6 P.M., and was at 60° at 10 P.M. I felt very cold, and could not get to sleep. Jackals made a continual howling during the night.

*November 16.*—I heard that there was war between two tribes of Bedouins on the eastern shore of the Jordan, which prevented intercourse with the people on that side. I observed that trees grew on the tops of the mountains of the E., which was not the case on the W. side of the Jordan and Dead Sea. We left Jericho for the Jordan at 9 A.M., and soon after observed the foundations of walls and heaps of ruins, but not such large stones as on the shore of the Dead Sea. We crossed a dry river bed; the plain had a gradual slope towards the Jordan, with shrubs in clumps. We reached the Jordan at 10·40 A.M.; by aneroid the "Pilgrim's bathing-place" was 104 feet above the Dead Sea. The waters flowed rapidly, but were very muddy; the temperature was 64°, that of the air being 80°. I collected three kinds of shells (one a bivalve); crabs\* were also seen in the river. Several poplars were growing on the bank, also willows and tamarisks. Palms I did not see, although the whole coast of the Dead Sea is strewn with them. The river was about 50 yards wide at that spot: I saw only one hawk and a kingfisher flying over its surface. At 11·30 A.M. we left the Jordan, and at 12 passed over about 20 yards of aqueduct; soon after we came to a stone well in the bed of the river, but it was only 6½ feet deep and full of stagnant water, being 250 feet above the Jordan. The banks of that river were so winding and thickly wooded that I could not take any bearings of the surrounding country. We then visited the ruins of the church of St. John, bearing S. 48 E. from Jericho.† At 2·10 P.M. we left the ruins, and a few minutes' riding took us across the bed of the first river; in three-quarters of an hour we crossed the bed of the Jericho river, and returned to our camp at 3·15 P.M.

*November 17.*—Up at 3·45 A.M.; thermometer 57°. We left Jericho at 6·50 A.M., just as the sun rose above the mountains of Moab. We rode through what must have been a fine garden in the bed of the river Araba, then passed under an aqueduct, of which I counted 11 arches, spanning the river, which appeared in good preservation; soon after we passed another aqueduct in ruins, only two arches remaining: then the sides of a third aqueduct were traceable nearer to the mountain: all of them had brought water from the river of Jericho to irrigate the plain

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\* *Thelphusis.*

† North end of Dead Sea bore S. 45 E.  
Ain el Feshkah, or Stride, S. 23 W.



towards the Dead Sea. We rode up on the N. side of the river Araba for some miles, the rocks being limestone. The road was in many places very winding and steep. At 9·23 A.M. we came to a pass, called the Khan Khatrudé, with a well, where the pilgrims, in general, rested; we then descended for a short time, and crossed at 9·40 the plain of the Robbers. At 10·30 we reached the point where the road joins from Nebi Musa; and at 11·25 A.M. we stopped to drink at the spring of the Apostles; temperature of water 71°. We passed through Bethany at 12·05, and arrived at Jerusalem at 12·50. The thermometer in my room was 60°. The baggage-mules did not arrive until three hours later.

*November 18 (Sunday).*—I had an attack of fever and ague in the afternoon, which I fear was caused by our camping on damp ground at Jericho.

*November 19.*—I was engaged settling the accounts of Fadlallah and the Tamari. Abú Daouk sent word that he was ill. Elijah Mashallam was also complaining of fever and ague from the cold: the change was so great and sudden, 60 instead of 90 degrees in 4 hours.

*November 20.*—I felt so ill that I was not able to go anywhere, and remained in Jerusalem until the 26th, when I left for Jaffa, to be in time for the steamer proceeding to Alexandria. I got to Ramleh at 6 P.M., and stopped at the convent all night.

*November 27.*—I left Ramleh at 5·35 A.M., and rode to Jaffa in two hours and twenty minutes, where I rested until 1 P.M., when I went on board the steamer, which left for Alexandria at 5 P.M.

[P.S. I beg to send in a section of levellings made by me in Palestine with the anéroid métallique.]









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